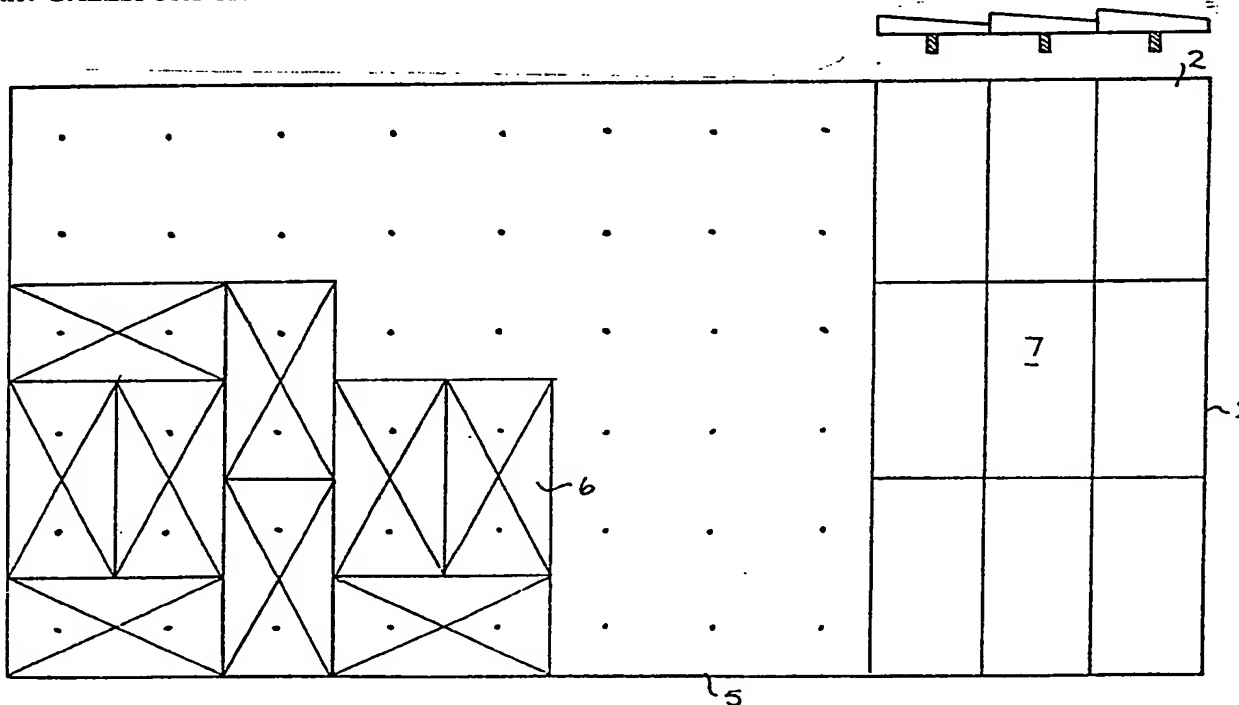




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**(54) Title:** BALLSPORT TRAINING AID**(57) Abstract**

A ball sport training aid comprising a frame (1) and a deflection surface (6 and 7), supported by said frame (1), against which surface a ball is projected, said surface characterized by a plurality of outwardly extending projections (6) which in use cause non uniform deflections of said ball.

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## BALLSPORT TRAINING AID

The present invention relates to a teaching aid for players of ball games such as tennis and cricket. More particularly the invention relates to a striking surface against which balls may be thrown and retrieved.

In ball games such as tennis, basketball, soccer and cricket, players are expected to sight the ball at little notice and proficiently deal with the ball, e.g. by return over the net in tennis, or by capture and thrown return as in cricket. The proficiency of a player to achieve the object of ball games relies heavily on his ability to react quickly. Tennis illustrates this more clearly in view of the large area of court to be covered and the need for an adequate return. Further in high grade tennis an adequate return is not sufficient to win a point and there is more pressure to make every return a winning one.

Accordingly to improve a ball players game, you must necessarily improve his reaction time to any typical situation. Typically in the past this improvement has been sought by practice with another player which includes that other player presenting particular situations over and over again. This method of practice, whilst being the one most widely used, suffers from the need to have a competent practicing partner. Such a person is not always available and thus practice time is limited.

In an effort to overcome this problem, a number of machines have been developed which play the role of a practicing partner. More particularly with games such as tennis, cricket and baseball, these machines are ball throwing machines. Such eject the ball at a player at various attitudes, curves, spins and speeds. Whilst these machines have been found to be most useful in improving a player's ability, they are nevertheless costly and thereby only of limited accessibility.

It is therefore the primary aim of the present invention to provide a teaching aid or practice means



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which is easily and cheaply fabricated and therefore accessible to most players or their clubs.

With this in mind it was found necessary to avoid expensive mechanisms which meant the teaching aids  
5 of the ejection type. Rather the aim was approached with the use of a deflection board in mind. In this respect it is well known that ball game players have practiced by throwing the ball against a flat wall. This type of ball return suffers from predictability. The ball player  
10 when commencing to throw the ball against a flat wall, may not know exactly the angle of reaction of the ball, however, this soon becomes apparent. Once the player realizes this, then he fails to improve his reaction time any further.

15 It is therefore apparent that the reaction time against such a deflection surface would be improved if the surface exhibited was unpredictable.

With such a deflection surface it would be only if a player could see exactly where the ball struck and  
20 reacted thereto, that this surface would be predictable. In such a case the player would have achieved an extremely high reaction state.

Accordingly there is provided a ballsport training aid comprising a frame and a deflection surface,  
25 supported by said frame, against which surface a ball is projected, said surface characterized by a plurality of outwardly extending projections which in use cause non uniform deflections of said ball.

According to another embodiment there is  
30 provided a ballsport training aid comprising a frame and a deflection surface, supported by said frame, against which surface a ball is projected, said surface characterized by a plurality of substantially planar panels, at least some of which have varying respective orientations.

35 In accordance with another embodiment there is provided a panel for use in the fabrication of a ballsport deflection surface characterized in that the panel has an



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upper surface and/or a lower surface, including outwardly extending projections.

It is also desirable for the invention to be adapted for ready change to provide a multitude of selections of striking surfaces. This may be achieved by the deflection surface being at least in part comprised of movable panels. Preferably such panels would be removable and have an outward or inward profile. Clearly such a panel may take any shape as long as it can be fixed on the surface.

In another preferred embodiment of the invention the deflection surface may comprise a central striking section composed of the aforesaid removable panels and side panels. The side panels should be designed to enable a wide angled shot against the surface to be returnable. Typically angled tiles or generally angled surfaces are used.

In another preferred embodiment of the invention the central striking section is supported by a generally rectangular framework and the panels are removably attached to that framework, e.g. by bolts. The fixing points may be regularly arranged to enable a panel to be fixed in two alternate attitudes. This has been found particularly the case when the removable panel has a rectangular base. Such construction may be affixed with its longitudinal base edges running either horizontally or vertically.

As mentioned previously, the removable panels may be of any shape thus allowing the teaching aid to be used with easy reacting panels for beginners, e.g. squat tetrahedrons, and hard reacting panels for proficient players, e.g. tall tetrahedrons. Accordingly the teaching aid would be most useful to clubs as it provides ready adaptability to use by a cross-section of players.



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In another preferred embodiment of the invention the striking surface may be tiltable about a generally horizontal axis. Therefore, in the case of a beginner, the surface is tilted to assist the upward deflection of the ball. As the player becomes more proficient the surface is returned to a vertical attitude.

Further investigations have been made into the applicability of the invention to cricket for not only fielding but also for batting practice.

In this respect for batting practice the deflection surface is conveniently located just in front of the batsman. To achieve the desired deflection it was felt that the panels should be mounted upon a cradle frame, which may optionally be inserted into the ground. With the view of making the apparatus cheap and adaptable also for fielding practice the cradle was designed to be preferably movable, thus allowing the panels to present alternate orientations to oncoming balls.

Accordingly there is also provided a practice aid comprising at least one longitudinal member and a plurality of striking surface support means, at least one of the support means attached to and extending transversely of the member in a first direction and at least one of said support means attached to and extending transversely of the member in a second direction.

In one preferred aspect of the invention, the support means transversely attached to the longitudinal member can rotate about the member.

In another preferred embodiment of the invention the longitudinal member includes at least one elongate member which is disposed to rotate about its longitudinal axis. Thus the support means may be fixedly attached to the elongate member (e.g. by welding) thereby permitting the support means to be rotated normally to the member.



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In yet another preferred embodiment, the apparatus comprises a base longitudinal member including two elongate tubular sleeves which are disposed generally parallel. A pair of striking surface support means are provided on each side of the base member and are respectively fixedly attached to the elongate tubular sleeves.

The support means may be of any shape which will facilitate the ultimate presentation of the desired striking surface. Nevertheless it has been found that an arcuate shape is particularly desirable.

Accordingly, in the position desired for batting practice, the apparatus is placed upon the ground adjacent the batting crease. The support means are raised so that a concave striking surface is adopted longitudinally of the pitch. The bowler then merely needs to bowl a ball so that it strikes the surface, which will give a random deflection thereto, thus presenting unpredictable ball attitudes to the batsman.

If fielding practice is desired, the support means are lowered by rotation of the arms about the longitudinal base and if necessary the base may be raised. Thus a pair of opposite concave surfaces can be presented. Players are positioned about the apparatus and the ball is thrown at one of the surfaces. Again the possible deflection of the ball is random, for example, it may fly upwardly to an opposite player.

To maintain the apparatus rigid it is desirable to produce a pair of transverse members each of which is selectively connectable to either the support means or striking surface depending upon which use to which the apparatus is being put.

Reference is now made to the accompanying drawings which are merely illustrative of the invention in which

Fig. 1 is a front view of a deflection surface made according to the invention;

Fig. 2 is a plan view of the striking surface of Fig. 1;



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Fig. 3 is a front view of an alternate striking surface made according to the invention;

Fig. 4 is a plan view of the striking surface of Fig. 3;

5 Fig. 5 is a partial view of a side panel portion of a striking surface;

Fig. 6 is a front view of a further alternate striking surface made according to the invention;

10 Fig. 7 is a plan view of the striking surface of Fig. 6;

Fig. 8 is a front view of the striking surface of Fig. 7 incorporated into a larger striking surface;

Fig. 9 is a plan view of an alternative means of tilting striking panels;

15 Fig. 10 is a plan view of the striking surface of Fig. 8.

Fig. 11 is a perspective view of a striking surface component;

20 Fig. 12 is the underneath perspective view of the component of Fig. 11;

Fig. 13 is a perspective view of an assembly of components of Fig. 11;

Fig. 14 is a front view of a striking surface from soccer;

25 Fig. 15 is a side view of the striking surface of Fig. 14;

Fig. 16 is a cross-sectional view of a first deflection component;

30 Fig. 17 is a cross-sectional view of second deflection component;

Fig. 18 is a cross-sectional assembly view of a third deflection component;

Fig. 19 is a perspective view of a cricket practice and support in the batting position;

35 Fig. 20 is a perspective view of the practice aid support of Fig. 19 in the fielding position;





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Fig. 21 is a collection of views of a desirable striking surface;

Fig. 22 is a perspective view of cricket practice striking surface in the batting position;

5 Fig. 23 is a perspective view of cricket practice striking surface in the fielding position;

Fig. 24 is a perspective view of cricket practice aid in the fielding position; and

10 Fig. 25 is a perspective view of cricket practice aid in the batting position.

In Fig. 1 there is depicted a striking surface 1 which is constructed to stand vertically. The striking surface comprises two side sections 2 and a central section 3. As is revealed in Fig. 2 these sections 2 and 3 are  
15 mounted upon a framework 4, the side sections 2 being angled away from the plane of central section 3. Central section 3 is made up of a plurality of tetrahedral tiles 5 thus presenting to an oncoming ball a variety of possible deflection surfaces. Clearly all or any of these tiles  
20 5 may be substituted by tiles of different profile. Further it is possible for tiles 5 to also be indented.

In contrast to the regular square base of tiles 5 in Fig. 1, in Fig. 3 is illustrated an alternate type of irregular tile. In this embodiment the tiles 6 are  
25 rectangular based tetrahedrons having a length equal to twice the width. Thus as shown, it is possible to mount these tiles 6 in at least two alternate positions to present a very irregular array of striking surfaces. Similarly side sections 2 as shown illustrate another  
30 alternate construction 7 particularly useful in tennis to bring a ball back to the normal hitting position after the player has been forced into a wide angled shot. These tiles may be affixed by any means. In Fig. 3 a regular array of bolting points is shown.

35



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In Fig. 5 another alternative panel 8 for the side panel 2 is shown. This panel 8 facilitates the presentation of a curved surface 9 to an oncoming ball. Similarly panels 8 may be used as shown in Figs. 6 and 7 to comprise another alternate striking surface 9. This particular shape is thought to be advantageous for basketball and soccer where larger diameter balls are used.

In. Figs. 8 and 10, a complete striking surface is shown comprising a plain deflection surface 10, alternate surfaces 11 and central plain area 12. This arrangement incorporates a reward system by reducing the difficulty of ball return if properly directed to the central area 12.

The actual striking surfaces may be orientated by use of projections 13 behind the tiles 14. Alternatively it is possible as shown in Figures 11, 12 and 13 to assemble a desired surface from component strips 14. Each strip 14 is provided with recesses 15. Thus by using a dowell piece 16 in between adjacent strips 14 it is possible to assemble the entire surface. Typically the strip 14 has alternate shapes on respective sides as can be seen by comparing Figures 11 and 12. It is not intended that dowell 13 will securely retain all the strips 14 together. Rather strips 14 are provided at their ends with recesses 16 which align and into which a transverse member 17 is placed. This member 17 is affixed to the strips 14 by any suitable means, e.g. bolts or nails. Member 17 is also provided with apertures 18 by which the entire striking member may be suspended from a fence or the like.

Figs. 14 and 15 show a striking surface aid which has been designed with soccer in mind. The striking surface 19 is supported by legs 20. On the surface 19 are a plurality of irregularly shaped deflection members 21. It will be noted that the upper edge areas A and central area B are provided with members 21. This is to



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deliberately indicate the areas at which a soccer play should aim. Areas A denote the top areas of a soccer net which are least protected by a goal keeper.

5 Figs. 14, 16 and 18 each characterize the construction of the member 21. Thus Fig. 14 shows the simplest construction of direct bolting whilst Figs. 16 and 18 depict the use of a spring means 22. It is desirable to incorporate a spring so that the striking surface 19 is not unduly jarred. Further it accentuates  
10 the lack of or predicable rebound.

In Fig. 19 an apparatus according to the present invention is depicted which comprises an elongate body member 23 having a plurality of sleeves 24. Sleeves 24 are free to rotate about member 23. Attached (welded)  
15 to sleeves 24 are arms 25 which are movable transversely to the member 23 and sleeves 24. Arms 25 are adapted to support a striking surface of the type shown in Figs. 21. 22 and 23. A plurality of striking surfaces 26 are used. They may be fixed by bolting or otherwise held in  
20 position on arms 25. As such the apparatus is normally placed in front of the batsmen adjacent the crease, with the sleeves 24 generally parallel to the centreline of the pitch.

In Fig. 20 the apparatus of Fig. 19 is shown  
25 wherein arms 25 have been rotated. Thus a pair of opposite concave surfaces are presented when the striking surfaces are attached to arms 25. This is the fielding practice position. The players are randomly spaced about the apparatus and practice begins by one player throwing  
30 the ball against one of the concave surfaces. Irregular deflection occurs.

Figs. 22 and 23 depict another means of fabricating the striking surfaces. Again the same system as disclosed in Fig. 13 is used however the result is  
35 a concave or convex surface. Further a joining member 27 is utilized. These surfaces are particularly useful for use with the apparatus of Figs. 19 and 20. Clearly



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the concave surface would be adapted for use in Fig. 20 whilst the convex surface is used with Fig. 19. As a further alternative these surfaces can be suspended to substantially vertical.

5 In Figs. 24 and 25 an alternative arrangement of the apparatus of Figs. 19 and 20 is given. A framework 28 is provided at each end of the striking surface 29. An intermediate framework 30 is attached to each of the striking surfaces 29. By raising the intermediate frame-  
10 work 30 the inner edges 31 of the surfaces 29 are raised thus forming the arrangement shown in Figure 24. To hold this arrangement it is convenient to attach framework 30 to each of the striking surfaces 29 by bolts 32. As  
15 such those surfaces can be used as a cricket fielding practicing aid.

The alternate arrangement of the apparatus is shown in Fig. 25. The intermediate framework 29 is lowered and attached to the framework 28. This action causes the outer edges 33 of the striking surfaces 29 to rise  
20 thus forming a concave surface. This arrangement is particularly useful for cricket batting practice where it is placed or recessed just in front of the batsman.



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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A ballsport training aid comprising a frame and a deflection surface supported by said frame, against which surface a ball is projected, said surface characterized by a plurality of outwardly extending projections which in use cause non uniform deflections of said ball.
2. A ballsport training aid according to claim 1 wherein said outwardly extending projections are conical and/or multifaced.
3. A ballsport training aid according to either claim 1 or claim 2 wherein said deflection surface is at least partially comprised of movable panels.
4. A ballsport training aid according to claim 3 wherein said movable panels include said outwardly extending projections.
5. A ballsport training aid according to any one of claims 3 or 4 wherein said movable panels are rectangular.
6. A ballsport training aid according to claim 5 wherein said panels have a length and a width in the ratio of at least 2 : 1.
7. A ballsport training aid comprising a frame and a deflection surface supported by said frame, against which surface a ball is projected, said surface characterized by a plurality of panels, at least some of which have varying respective orientations.
8. A ballsport training aid according to claim 7 wherein said panels are movable.



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9. A ballsport training aid according to either claims 7 or 8 wherein said panels are each rectangular and are placed adjacent each other to form a quasi-curved portion of said deflection surface.
10. A panel for use in the fabrication of a ballsport deflection surface characterized in that the panel has an upper surface and/or a lower surface including outwardly extending projections.
11. A panel according to claim 9 wherein said panel is rectangular.
12. A panel according to either claims 10 or 11 wherein said outwardly extending projections are conical and/or multi-faced.
13. A practice aid comprising at least one longitudinal member, a deflection surface and a deflection surface support means, at least one of the support means attached to and extending transversely of the member in a first direction and at least one of said support means attached to and extending transversely of the member in a second direction.
14. An aid according to claim 13 wherein the support means are rotatably attached to the longitudinal member.
15. An aid according to claim 14 wherein the longitudinal member includes at least one elongate member disposed to rotate about its longitudinal axis.
16. An aid according to claim 13 wherein said longitudinal member includes two tubular sleeves disposed generally parallel to one another.



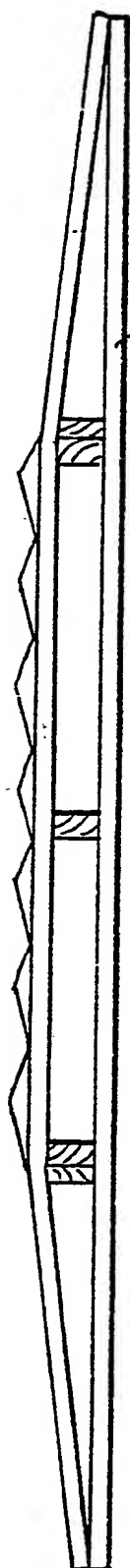


FIG. 2.

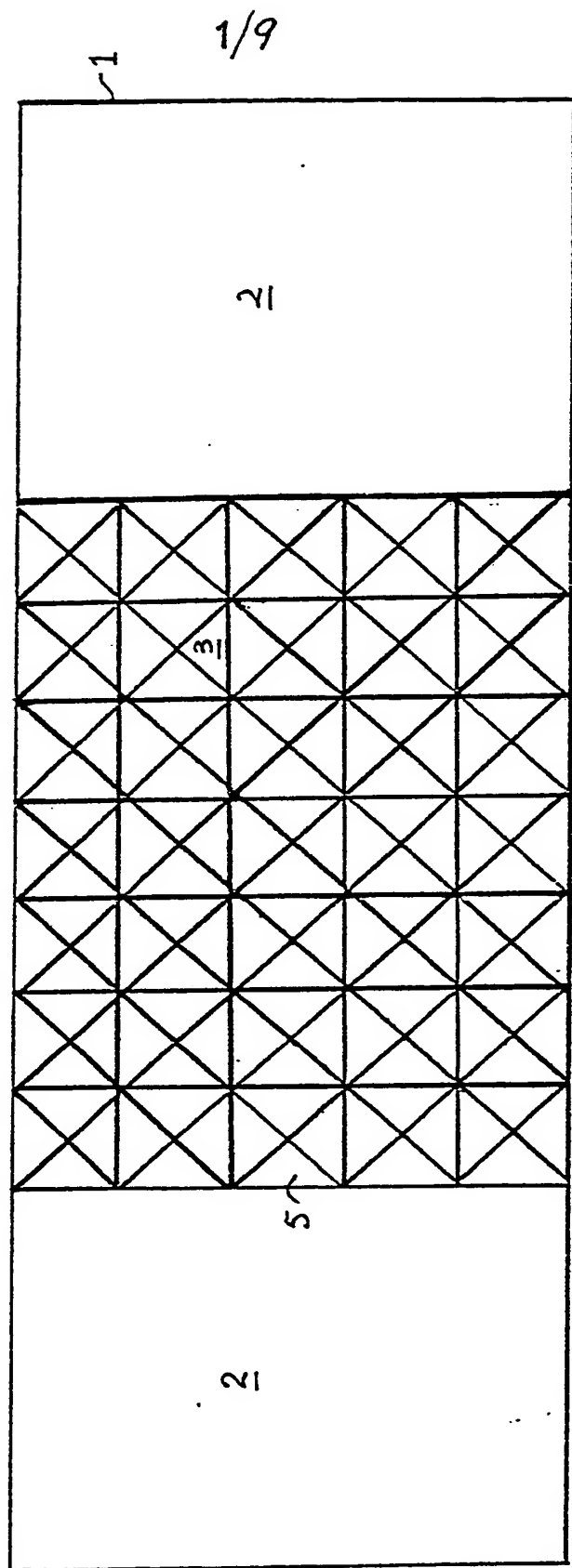


FIG. 1.



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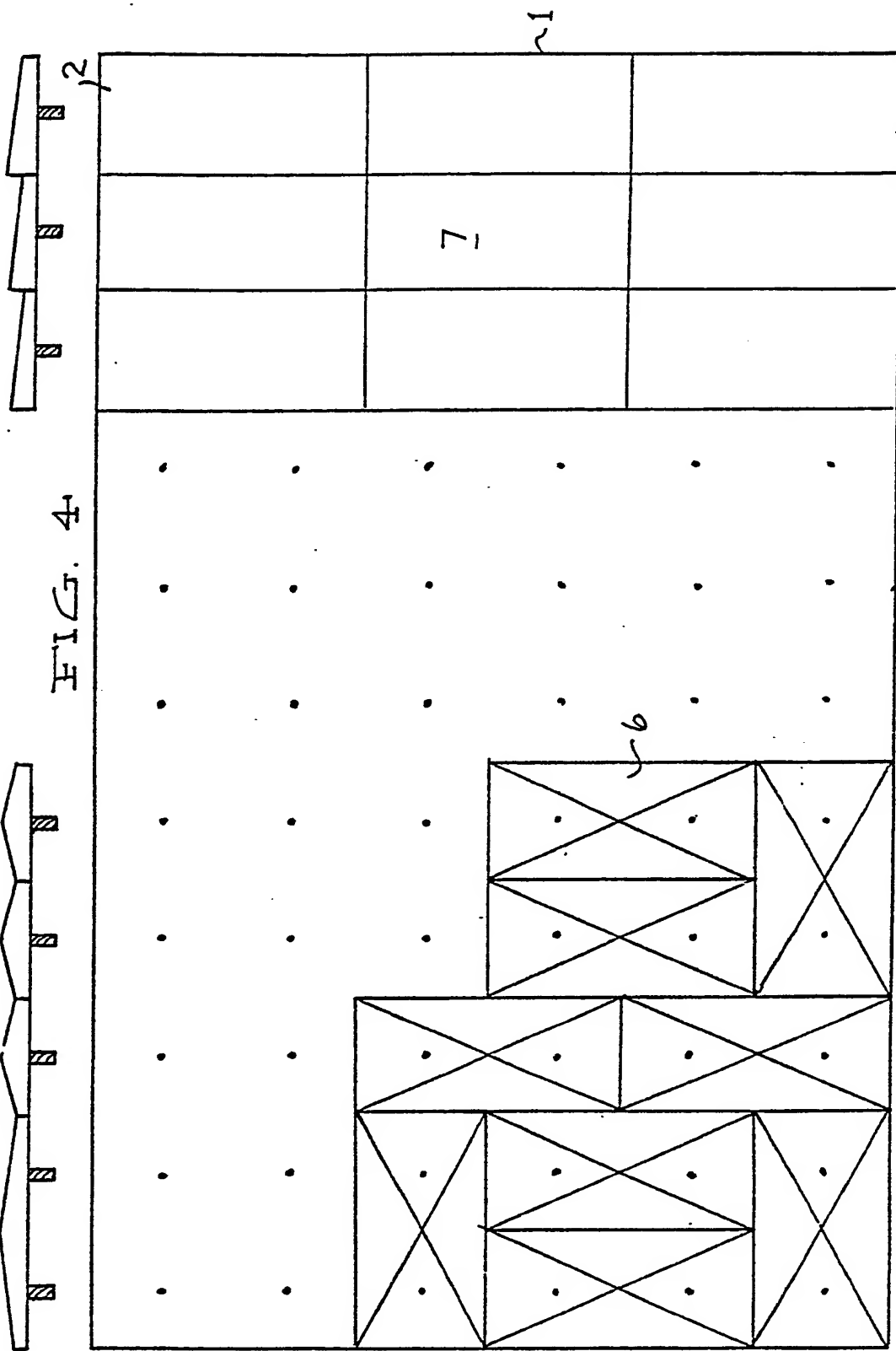


FIG. 4

FIG. 3





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FIG. 7.

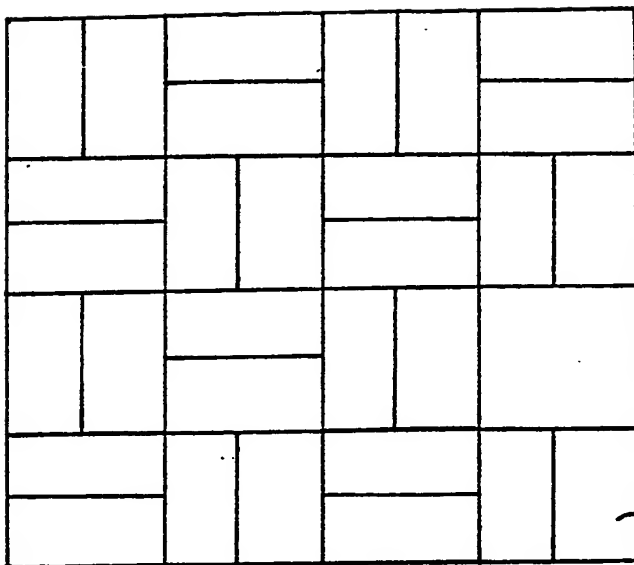


FIG. 6.

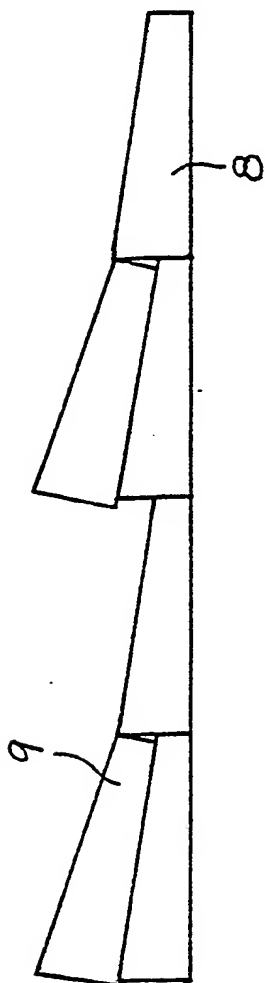


FIG. 5.

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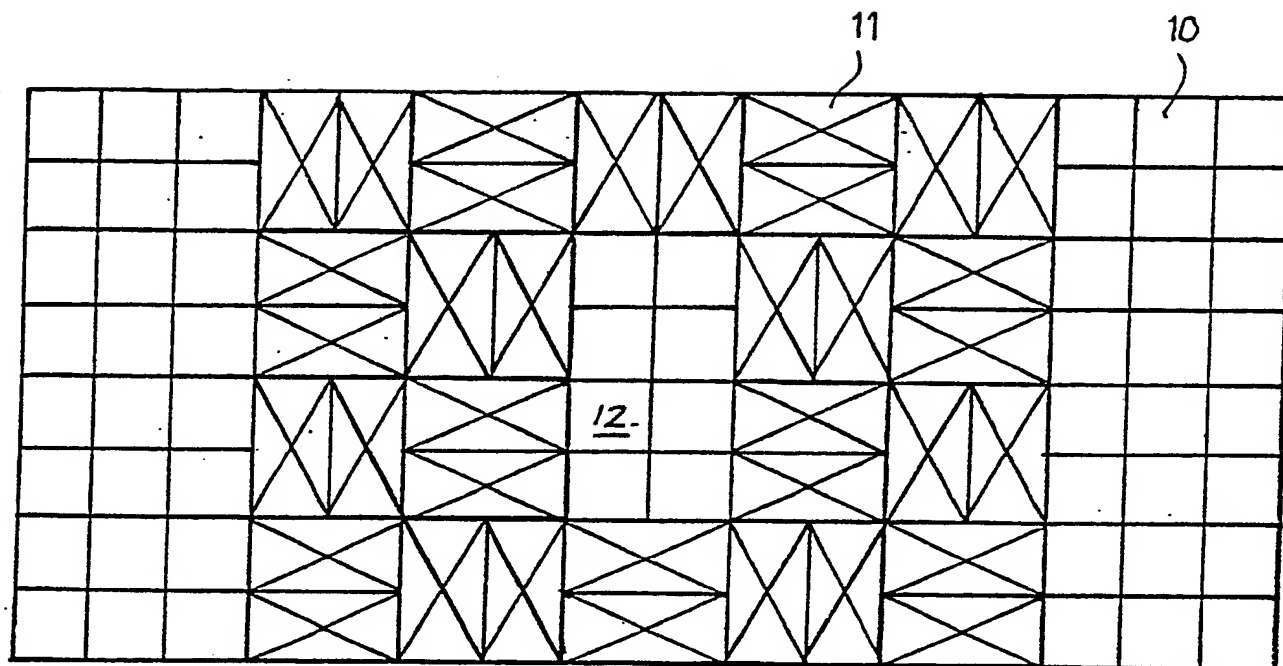


FIG. 8.



FIG. 9.

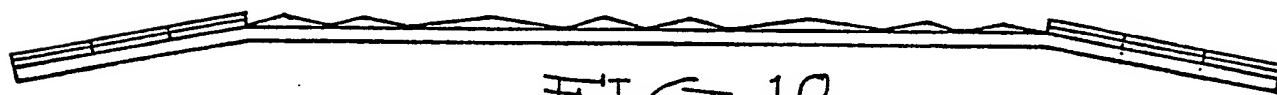


FIG. 10.

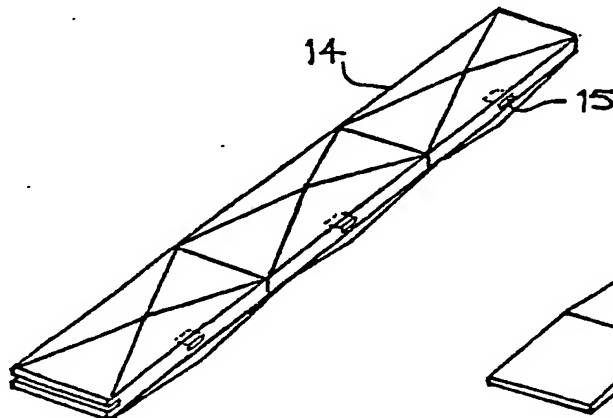


FIG. 11

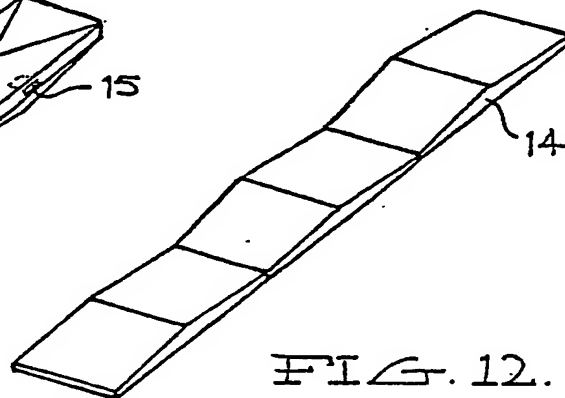
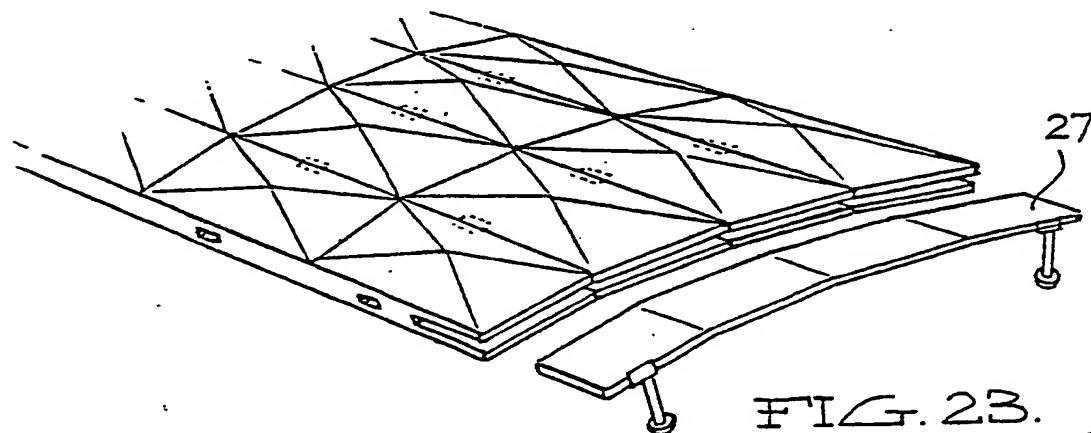
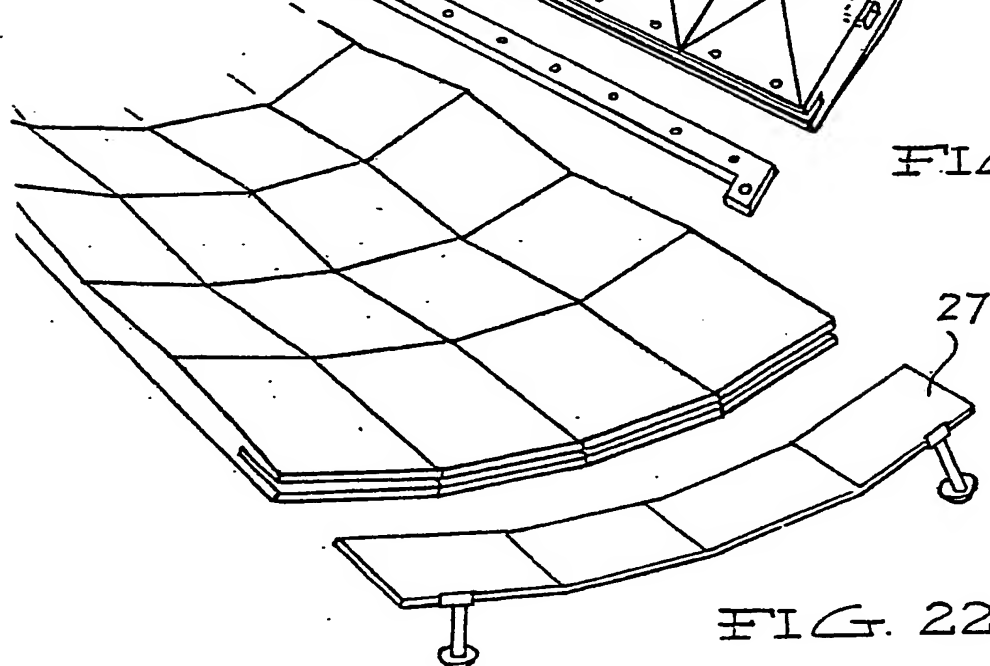
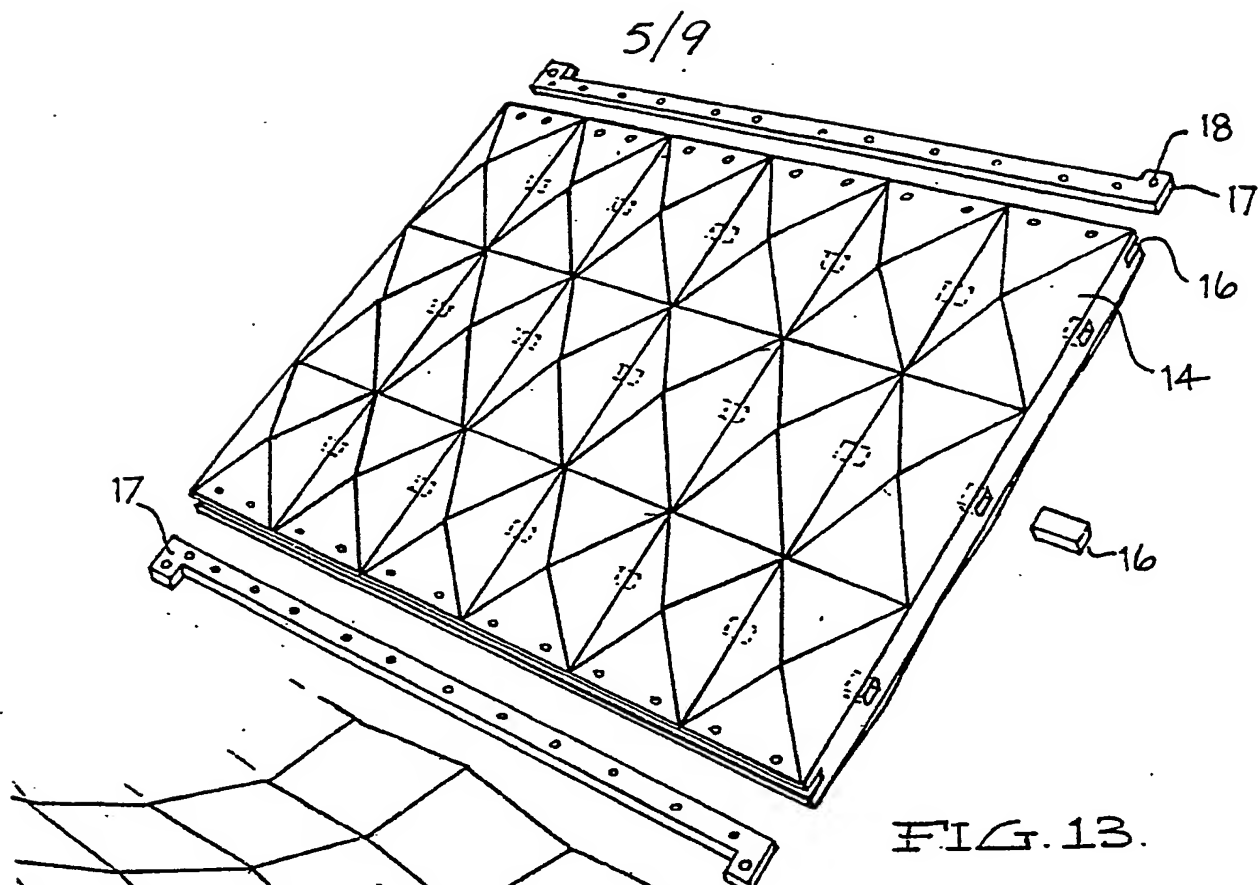
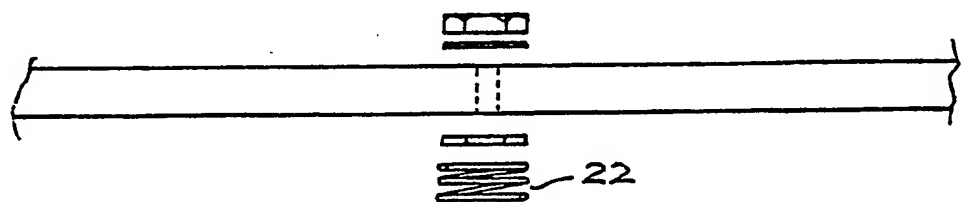
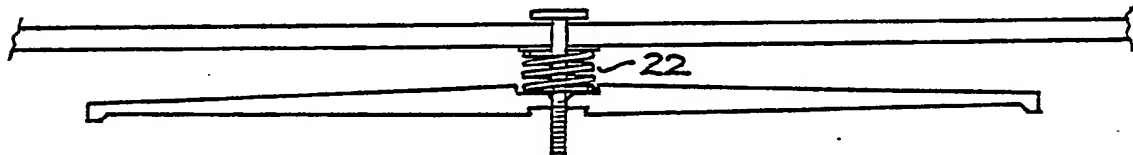
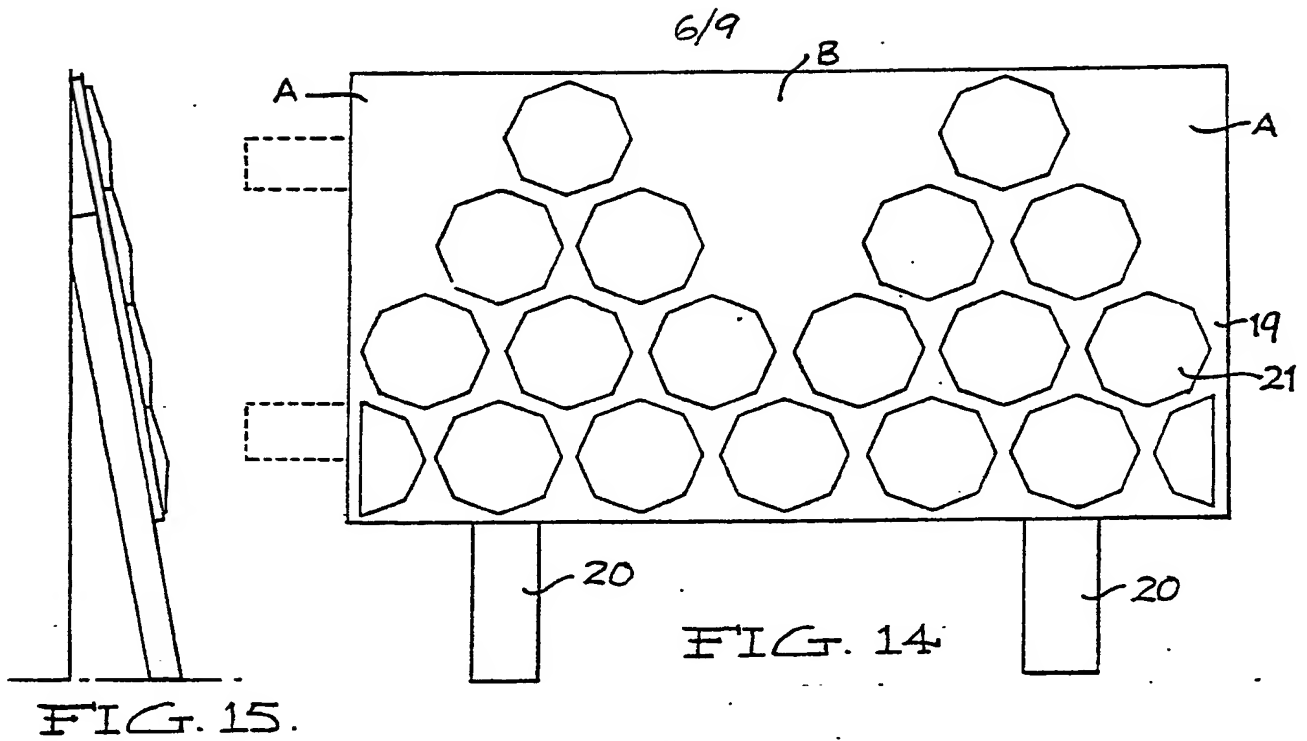


FIG. 12.







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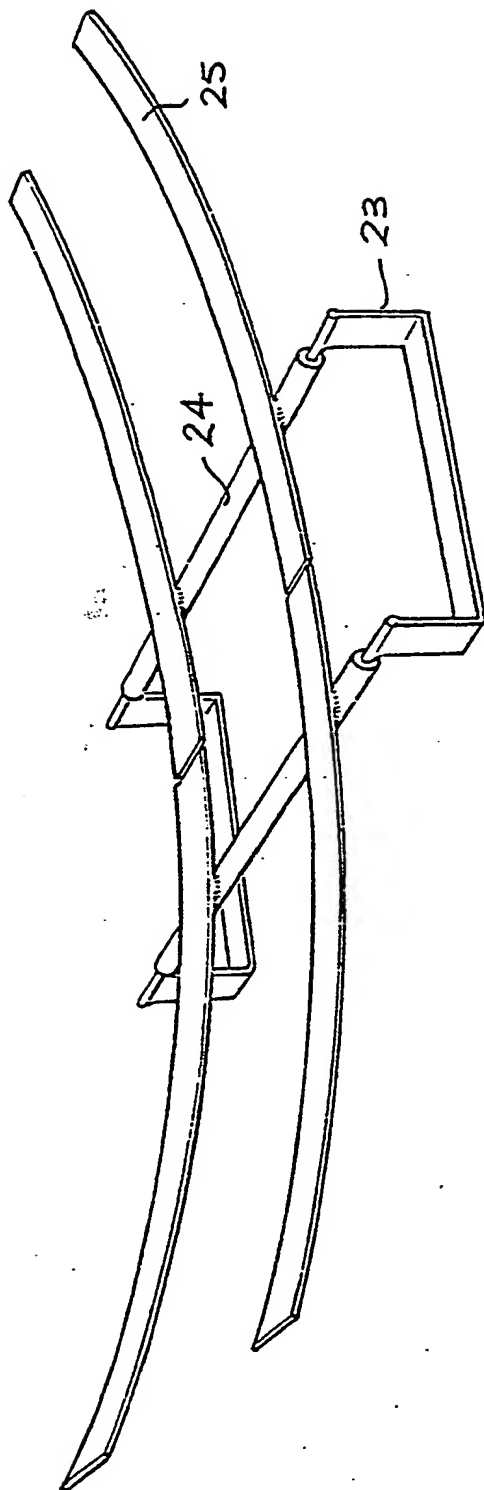


FIG. 19.

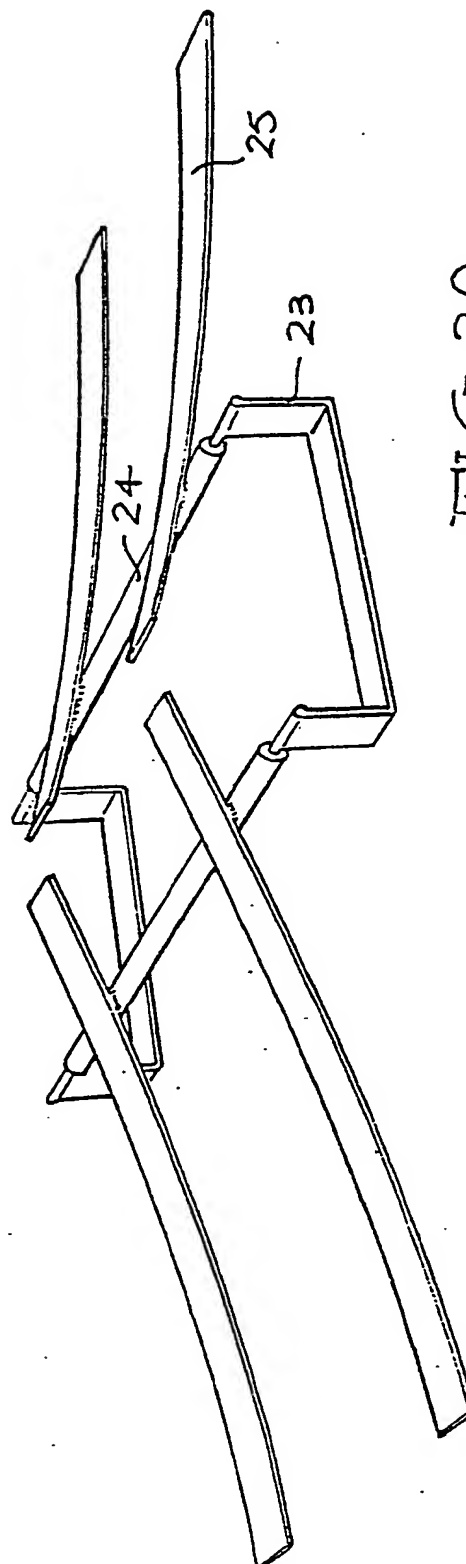


FIG. 20.

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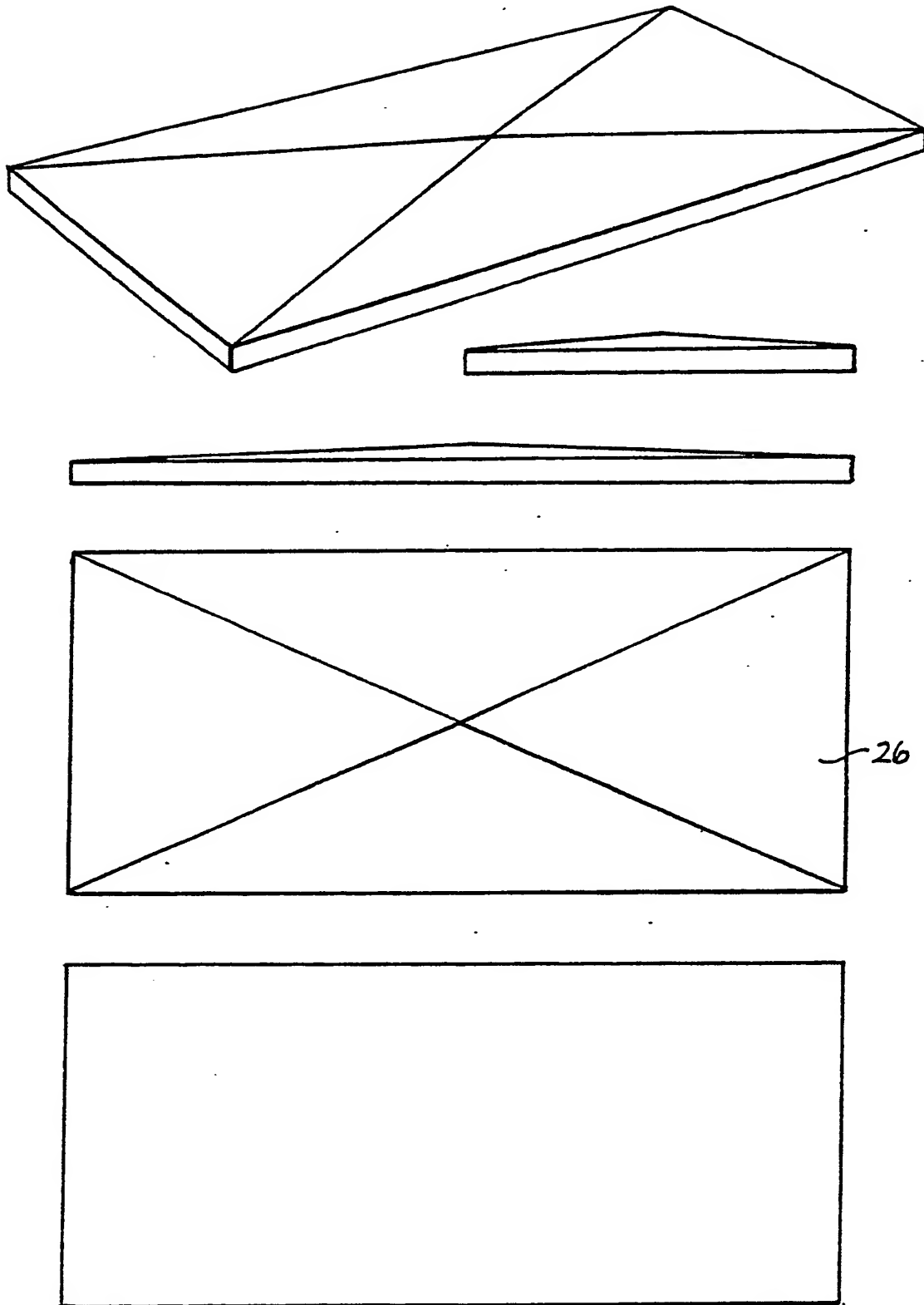


FIG. 21.

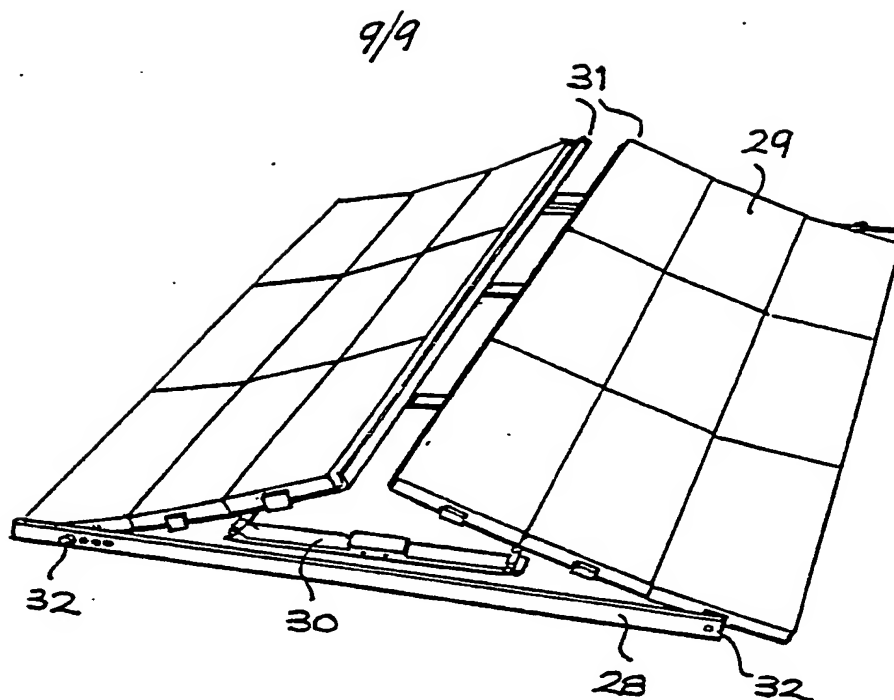


FIG. 24

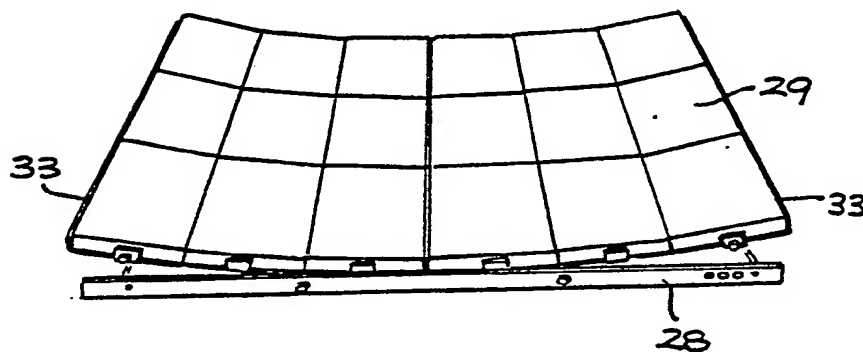


FIG. 25.

# INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 83/00085

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>3</sup>		
According to International Patent Classification (IPC) or to both National Classification and IPC Int. Cl. <sup>3</sup> A63B 69/00, 69/38		
<b>II. FIELDS SEARCHED</b>		
Minimum Documentation Searched <sup>4</sup>		
Classification System	Classification Symbols	
IPC	A63B 69/00, 69/38	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched <sup>5</sup>		
AU: IPC as above		
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT</b> <sup>14</sup>		
Category <sup>6</sup>	Citation of Document, <sup>10</sup> with indication, where appropriate, of the relevant passages <sup>11</sup>	Relevant to Claim No. <sup>12</sup>
X	AU, A, 68113/81 (LOMBARDI, HULT & TROWBRIDGE) 11 February 1982 (11.02.82)	(7, 9)
X	AU, A, 60747/69 (TRANLY WALLS AND MINI COURTS) 18 March 1971 (18.03.71)	(1,2,10,11, 12)
X	AU, B, 40993/58 (234082) (DENNISON) 3 March 1960 (03.03.60)	(7,8,9)
X	US, A, 3088735 (CLARK) 7 May 1963 (07.05.63)	(1,2,10,11, 12)
X	GB, A, 1220057 (SCHOFIELD) 20 January 1971 (20.01.71)	(1-8, 10-12)
X	DE, C, 929472 (RIGO) 27 June 1955 (27.06.55)	(1-5, 10,11, 12)
X	DE, A, 2918114 (NATUS) 13 November 1980 (13.11.80)	(1,2,10,11, 12)
X	DE, A, 2916262 (NATUS) 30 October 1980 (30.10.80)	(1,2,10,11, 12)
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<b>IV. CERTIFICATION</b>		
Date of the Actual Completion of the International Search <sup>15</sup>		Date of Mailing of this International Search Report <sup>16</sup>
23 September 1983 (23.09.83)		29 September 1983 (29.09.83)
International Searching Authority <sup>17</sup>		Signature of Authorized Officer <sup>18</sup>
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